

THE IMPACT OF UNEMPLOYMENT ON HEALTH: A REVIEW OF THE EVIDENCE

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Abstract • Résumé

Objective: To review the scientific evidence supporting an association between unemployment and adverse health outcomes and to assess the evidence on the basis of the epidemiologic criteria for causation.

Data sources: MEDLINE was searched for all relevant articles with the use of the MeSH terms "unemployment," "employment," "job loss," "economy" and a range of mortality and morbidity outcomes. A secondary search was conducted for references from the primary search articles, review articles or published commentaries. Data and definitions of unemployment were drawn from Statistics Canada publications.

Study selection: Selection focused on articles published in the 1980s and 1990s. English-language reports of aggregate-level research (involving an entire population), such as time-series analyses, and studies of individual subjects, such as cross-sectional, case-control or cohort studies, were reviewed. In total, the authors reviewed 46 articles that described original studies.

Data extraction: Information was sought on the association (if any) between unemployment and health outcomes such as mortality rates, specific causes of death, incidence of physical and mental disorders and the use of health care services. Information was extracted on the nature of the association (positive or negative), measures of association (relative risk, odds ratio or standardized mortality ratio), and the direction of causation (whether unemployment caused ill health or vice versa).

Data synthesis: Most aggregate-level studies reported a positive association between national unemployment rates and rates of overall mortality and mortality due to cardiovascular disease and suicide. However, the relation between unemployment rates and motor-vehicle fatality rates may be inverse. Large, census-based cohort studies showed higher rates of overall mortality, death due to cardiovascular disease and suicide among unemployed men and women than among either employed people or the general population. Workers laid off because of factory closure have reported more symptoms and illnesses than employed people; some of these reports have been validated objectively. Unemployed people may be more likely than employed people to visit physicians, take medications or be admitted to general hospitals. A possible association between unemployment and rates of admission to psychiatric hospitals is complicated by other institutional and environmental factors.

Conclusions: Evaluated on an epidemiologic basis, the evidence suggests a strong, positive association between unemployment and many adverse health outcomes. Whether unemployment causes these adverse outcomes is less straightforward, however, because there are likely many mediating and confounding factors, which may be social, economic or clinical. Many authors have suggested mechanisms of causation, but further research is needed to test these hypotheses.

Objectif : Revoir les preuves scientifiques qui associent chômage et bilan de santé négatif et les évaluer en fonction des critères épidémiologiques pour en déterminer la relation de causalité.

Sources des données : On a fait une recherche dans MEDLINE pour y trouver tous les articles pertinents contenant les termes MeSH «chômage», «emploi», «perte d'emploi», «économie» et un éventail de résultats de mortalité et de morbidité. On a effectué une recherche secondaire des références provenant des articles, des examens critiques ou des commentaires publiés relevés à la première recherche. Les données et les définitions du chômage proviennent de publications de Statistique Canada.

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Sélection d'études : La sélection a porté sur les articles publiés dans les années 1980 et 1990. On a revu les rapports en anglais d'études générales (portant sur une population complète), comme les analyses de séries chronologiques, et les études de sujets individuels, par exemple, les études transversales, les études cas-témoins ou les études de cohortes. Au total, les auteurs ont examiné 46 articles qui décrivaient des études originales.

Extraction de données : On a cherché des renseignements sur l'association (le cas échéant) qu'il y avait entre le chômage et le bilan de santé, par exemple, le taux de mortalité, des causes spécifiques de décès, l'apparition de troubles physiques et mentaux et le recours à des services de soins de santé. On a extrait des renseignements sur la nature de l'association (positive ou négative), des mesures d'association (risque relatif, ratio de probabilité ou ratio de mortalité normalisé) et la tendance de la causalité (à savoir si le chômage a eu des conséquences négatives sur la santé, ou vice versa).

Synthèse des données : La plupart des études générales ont indiqué qu'il y avait une association positive entre le taux de chômage national et le taux de mortalité global et de mortalité imputables à des maladies cardiovasculaires et des suicides. Cependant, la relation entre les taux de chômage et les taux de mortalité par accident d'automobile peut être inverse. Les importantes études de cohortes fondées sur les données du recensement indiquent des taux plus élevés de mortalité global, de décès par suite de maladie cardiovasculaire ou de suicide chez les hommes et les femmes sans travail que chez les autres personnes occupées ou la population en général. Les travailleurs mis à pied à la suite d'une fermeture d'usine ont signalé un plus grand nombre de symptômes et de maladies que les personnes occupées; on a pu valider objectivement une partie de ces rapports. Les chômeurs sont sans doute plus susceptibles que les personnes occupées de consulter leur médecin, de prendre des médicaments ou d'être admis à un hôpital général. Une association possible entre le chômage et le taux d'admission à un hôpital psychiatrique se complique par d'autres facteurs institutionnels et environnementaux.

Conclusions : Évaluées sur une base épidémiologique, les preuves laissent croire qu'il existe une forte association positive entre le chômage et un grand nombre de résultats défavorables sur le plan de la santé. Reste à savoir si le chômage en est la cause, car il y a vraisemblablement de nombreux facteurs médiateurs et confusionnels qui peuvent être de nature sociale, économique ou clinique. Beaucoup d'auteurs ont proposé des mécanismes de causalité, mais d'autres recherches s'imposent pour vérifier ces hypothèses.

The recent recession in Canada has caused a high level of unemployment. According to Statistics Canada, in March 1995, 10.8% of the labour force was unemployed.¹ In March 1993, 1 696 000 Canadians (12.3% of the labour force) were out of work, the highest level since World War II.² This official figure, however, is based on a narrow definition of "the unemployed": those people who actively sought work in the preceding 4 weeks and who did not work more than 1 hour in the previous week.^{1,3}

Excluded are two large groups that constitute the "hidden unemployed."³⁻⁶ The first group consists of people on the "margins of the labour force": those "who want work and are available for work" but did not seek it in the previous week because of illness, personal or family responsibilities, waiting for replies to job applications, or having given up looking for work ("discouraged workers").^{2,4} The second group comprises those who hold part-time jobs but are available for full-time work (the "underemployed").² Although not truly jobless, the underemployed may be said to suffer relative unemployment. Including these two groups in unemployment figures would mean a "real" unemployed population of approximately 2 830 000 Canadians, or 20.0% of the labour force, in March 1993 (the last year in which data were collected according to the above categories).² Still

not included are those who are working full-time but considered overqualified for their jobs, also sometimes referred to as "underemployed."

Whatever the "real" rate, unemployment has been a high-profile issue, yet the possible adverse impact on the physical and mental health of the population has generally received little attention in public discourse and policy making.^{7,8}

In the health and social-science literature, however, the association of unemployment (and other aspects of economic hardship) with adverse health consequences has been investigated for many years. In 1897 European historian Emile Durkheim observed that suicides seemed to occur more often during economic changes that disturbed the "social fabric" of society.⁹

Since the early 1970s, many studies of the apparent relation between indices of economic downturn and overall mortality rates in Western countries have been published, one of the best-known authors being M. Harvey Brenner of Johns Hopkins University.^{8,10-17}

The main objective of this article is to review the epidemiologic evidence supporting an association between unemployment and health outcomes in the population. Since many review articles^{8,18-21} and commentaries²²⁻²⁸ have already been published, we wished not only to investigate any association but also to test the evidence ac-

according to the epidemiologic criteria for causation established by Bradford Hill.²⁹ This was not attempted in any article that we reviewed. A related question involves the direction of causation. Does unemployment cause poor health, or is it more likely that poor health causes unemployment? The latter has been termed the "health-selection" or "reverse-causation" hypothesis.^{30,31}

DATA SOURCES

We searched MEDLINE with the use of the MeSH terms "unemployment," "employment," "job loss," "economy" (or "economic") and a broad range of health outcomes (mortality, morbidity and the use of health care services) for articles in English. A secondary search was conducted of references in the articles retrieved through the MEDLINE search. To ensure that the review was current, we preferred reports of original research published in the 1980s or 1990s; however, earlier articles considered significant were also included. We included some review articles and commentaries to aid in finding further original studies and to provide background information on the issue of unemployment and health. Current definitions and data on unemployment were obtained from Statistics Canada publications.

We reviewed 69 articles, 46 of which described original research studies. We categorized these studies according to their design and level of data collection and analysis. In terms of design, studies were designated cross-sectional (studies that collected and analysed data at one point in time) or longitudinal (those that analysed data collected during a long period, often years or decades).

In terms of level, we considered aggregate-level or macro-level studies in which data for the entire population of nations, states or cities were analysed. Many of these studies used time-series analysis to examine correlations between unemployment rates and health status indicators, such as mortality rates, during a period of time. By contrast, individual-level or micro-level studies measured health outcomes among a sample of unemployed people and compared these outcomes with those of a control group of employed people or with those of the general population. Individual-level longitudinal studies involving control groups had cohort or case-control designs. A common cohort-study design was the "factory-closure" study, in which the health outcomes of workers laid off as a result of a factory closure were measured prospectively and compared with those of workers at a workplace that was still in operation.

In some individual-level studies, relative risks were calculated as the ratio of the incidence of a health outcome (usually mortality or morbidity) in the unemployed group to that in the employed group or in the

general population. In case-control studies, odds ratios were calculated to estimate the relative risks.

FINDINGS

The studies reviewed are categorized according to their main health outcome measures: mortality rate (overall or by cause) or morbidity rate, including use of health care services.

UNEMPLOYMENT AND OVERALL MORTALITY RATES

Among the aggregate-level time-series analyses we reviewed were several by Brenner (with Mooney as a coauthor on some), reporting correlations between national unemployment levels and overall mortality rates in nine Western countries, including the United States from 1909 to 1976 and from 1940 to 1973,^{8,11,14} England and Wales from 1936 to 1976,¹² Scotland from 1952 to 1983,¹⁵ and Sweden from 1940 to 1973.¹⁷ In 1976 Brenner found that a 1% rise in unemployment was correlated with approximately 6000 excess deaths annually in the United States.¹¹

Gravelle, Hutchinson and Stern³² criticized Brenner's time-series analysis for omitting 20th-century trends in income, education, occupation, housing status, nutrition and medical treatment. Brenner later recognized this omission and constructed more sophisticated models that took these other factors into account.^{8,17}

From a similar time-series analysis for Canada from 1950 to 1977, Adams³³ found a generally inverse association between annual unemployment levels and rates of overall mortality. Adams gave the following possible reasons for finding an inverse relation: (1) faulty assumptions concerning lag times between increases in unemployment and increases in mortality rates, (2) "dilution" of the association between joblessness and actual financial hardship by unemployment insurance benefits, (3) a decrease in "societal [business] activity" as a result of unemployment, and therefore lower risks of work-related deaths, (4) reduced alcohol and tobacco consumption because of lack of employment income, and therefore lower mortality risks, and (5) confounding of the relation between unemployment and adverse health outcomes because of inequality in income.³³ Adams did not test these hypotheses.

In individual-level studies, many years of observation are needed because deaths among working-age populations are relatively infrequent. Several longitudinal studies conducted in Europe achieved adequate statistical power by identifying large cohorts of unemployed people through the national census.³⁴⁻³⁹ Table 1 gives the standardized mortality ratios (SMRs) or relative risks (RRs) of mortality estimated for these cohorts after vary-

ing follow-up periods. Most SMRs were considered statistically significant (5% probability of a Type I error).

One study conducted in Britain used data on a 4% random sample of working-age men in England and Wales provided by the Office of Population Censuses and Surveys (OPCS).³⁴⁻³⁶ The men were defined as "unemployed" if they had sought work in the week before the census. In a census-based study conducted in Italy, the cohort was defined in the same way.³⁷ In that study, men defined as jobless at the times of both the 1976 and 1981 censuses had a higher SMR than those out of work in 1976 or 1981 only (Table 1). This finding suggests that longer-term unemployment is more harmful than short-term joblessness.

A Finnish cohort study differed from these studies in defining "unemployed" as having sought work at any time in the year before the census.³⁸ A striking finding of this study was that the SMR increased parallel to an increasing duration of unemployment (from 1 to 12 months) before the census (Table 1).

A census-based study in Denmark examined unemployed female as well as male workers.³⁹ Workers of both sexes unemployed in 1970 had a significantly greater SMR than their employed counterparts during the subsequent 10 years. The British studies based on OPCS

data also found higher 10-year relative mortality rates among the wives of men who were unemployed at the time of the 1971 census (Table 1).³⁵

The similar outcomes of these large cohort studies provide evidence of a positive association between unemployment and risk of death from all causes. Health selection (reverse causation) was only a minor factor because the studies included only those actively seeking work, thus excluding people who are chronically ill or disabled. The editor of the *British Medical Journal* commented in 1991 that "the evidence that unemployment kills — particularly the middle-aged — now verges on the irrefutable."²²

DEATH DUE TO CARDIOVASCULAR DISEASES

The specific causes of death most often studied were cardiovascular diseases and suicide. Interest in outcomes involving cardiovascular diseases, especially heart disease, arose as a result of the hypothesis that unemployment induces stress and may therefore be a risk factor for heart disease.^{8,40,41} Brenner reported positive associations between unemployment and death due to heart disease from time-series data on the populations of the United States, Canada, Australia, Denmark, Finland, France,

Table 1: Results of longitudinal studies of rates of overall mortality among unemployed people

Study	Study population	Definition of unemployment used	Study period	Size of sample of unemployed people	Estimate of risk of death compared with risk in general population (and 95% CI*)
Moser, Goldblatt et al ³⁴ and Moser, Fox et al ³⁵	British men 15-64 years of age and their spouses	Seeking work in the week before the 1971 census	1971-81	5 861 men 2 906 women (spouses)	SMR† 121 (108-135), men SMR 120 (102-139), spouses
Moser, Goldblatt et al ³⁴	British men 16-64 years of age	Seeking work in the week before the 1981 census	1981-83	14 675	SMR 147 (118-180)
Costa et al ³⁷	Italian men 15-59 years of age	Seeking work in the week before: • the 1981 census • the 1976 census • the 1976 and the 1981 censuses	1981-85 1976-85 1976-85	13 462	SMR 202 (not stated) SMR 187 (159-222) SMR 256 (209-308)
Martikainen ³⁸	All Finnish wage-earning men 30-54 years of age	Seeking work before the 1980 census for: 1-3 mo 4-6 mo 7-11 mo 12 mo	1981-85	202 000 person-years as follows: 75 000 56 000 40 000 31 000	RR‡ 1.93 (1.82-2.05) SMR 140 (not stated) SMR 201 (not stated) SMR 274 (not stated) SMR 326 (not stated)
Iversen et al ³⁹	Danish labour force 20-64 years of age	Unemployed on the day of the 1970 census	1970-80	22 000	RR 1.59 (1.40-1.78), men RR 1.58 (1.51-1.65), women

*CI = confidence interval

†SMR = standardized mortality ratio

‡RR = relative risk

Germany, Sweden,^{8,16} England and Wales,^{13,16} and Scotland.¹⁵ These associations were found after the data had been adjusted for trends in consumption of tobacco, alcohol and dietary fat,^{16,17} and, in Scotland, for increased death rates during unusually long, cold winters.¹⁵

Bunn⁴² reported positive correlations between unemployment and death due to heart disease from the results of an aggregate-level study in Australia. Adams' analysis of Canadian data also revealed that unemployment had a positive relation with rates of death due to heart disease, despite the inverse correlation with overall mortality rates.³³ To account for these contrary findings, Adams postulated that fatal heart disease occurs mainly in older

adults, but that their jobless rate runs counter to the overall trend: a general job scarcity encourages older workers to retire from the labour force, hence lowering their unemployment rate.³³

The results of census-based longitudinal studies conducted in Europe on cardiovascular causes of death and their relation to unemployment are summarized in Table 2. Significantly higher SMRs for these causes of death were found among the British cohort of unemployed men from the 1981 census, the wives of the men (although not the men themselves) in the 1971 cohort, the Finnish cohort of men in the 1980 census and the Danish cohorts of men and women in the 1970 census.^{34,36,38,39}

Table 2: Results of longitudinal studies of rates of mortality due to specific causes among unemployed people

Study	Study population	Definition of unemployment used	Study period	Size of sample of unemployed people	Estimate of risk of death compared with risk in general population (and 95% CI)
Studies of mortality due to cardiovascular disease					
Moser, Goldblatt et al ³⁴	British men 16–64 years of age	Seeking work in the week before the 1981 census	1981–83	14 675	SMR 182 (129–245), ischemic heart disease SMR159 (116–210), all cardiovascular disease
Moser, Fox et al ³⁵	British men 15–64 years of age and their spouses	Seeking work in the week before the 1971 census	1971–81	5 861 men 2 906 women (spouses)	SMR 107 (82–138), men SMR 157 (115–206), ischemic heart disease, women SMR 129 (101–161), all cardiovascular disease, women
Martikainen ³⁸	All Finnish wage-earning men 30–54 years of age	Seeking work some time in the year before the 1980 census	1981–85	202 000 person-years	RR 1.54 (1.40–1.70), all cardiovascular disease RR 1.36 (1.18–1.56), myocardial infarction
Iversen et al ³⁹	Danish labour force 20–64 years of age	Unemployed on the day of the 1970 census	1970–80	22 000	RR 1.28 (1.18–1.39), men RR 1.41 (1.08–1.83), women
Studies of mortality due to suicide					
Moser, Fox et al ³⁵	British men 15–64 years of age	Seeking work in the week before the 1971 census	1971–81	5 861	RR 1.6* (not stated)
Martikainen ³⁸	All Finnish wage-earning men 30–54 years of age	Seeking work for 1 to 12 months before the 1980 census	1981–85	202 000 person-years	RR 1.92 (1.62–2.27)
Iversen et al ³⁹	Danish labour force 20–64 years of age	Unemployed on the day of the 1970 census	1970–80	22 000	RR 2.5* (not stated)

* $p < 0.05$

Significantly high SMRs for death due to ischemic heart disease were found in the British cohort of men in the 1981 census³⁶ and for deaths from myocardial infarction in the Finnish cohort.³⁸

Rates of death due to stroke have also been examined. Franks and associates⁴³ analysed data provided by the OPCS on adults 45 to 74 years of age living in Greater London from 1971 to 1981. They found a strong correlation between rates of death due to stroke and unemployment among men, imputing a "dose-response" relation of 5.4 excess deaths due to stroke per 100 000 men for every 1% increase in the jobless rate. However, no significant association was found among women.⁴³ Brenner and Mooney⁸ also reported positive associations between unemployment rates and rates of mortality due to cerebrovascular causes in Canada, Sweden, France and Germany.

Some individual-level studies looked at intermediate cardiovascular outcomes such as elevated levels of blood pressure or serum cholesterol.^{19,40,41,44} In a retrospective cohort study of Swedish male shipyard workers threatened with job loss, the subjects had increases in mean serum cholesterol and triglyceride levels as well as systolic and diastolic blood pressure; they also gained weight.⁴⁴ Sleep disturbance, experienced by many of the workers, was thought to be a sign of stress. The large sample size of this study, and the fact that the investigators controlled for potentially confounding factors affecting cardiovascular risk (dietary, tobacco and alcohol intake), strengthened the findings.⁴⁴

SUICIDE

Platt²⁰ reviewed 95 studies of unemployment or job loss and suicide or attempted suicide published from 1953 to 1982. Most individual-level, cross-sectional studies reviewed found that people who committed suicide were more likely to be jobless when they died than were people who died from other causes. However, it was difficult to show that job loss had triggered individual acts of suicide.²⁰

Aggregate-level cross-sectional studies conducted in the United States, England and Europe did not consistently show a higher incidence of reported suicide in areas of high unemployment. In fact, they found that, in areas of low unemployment, jobless people may actually have reacted worse than those in areas where many others were also out of work.²⁰

In aggregate-level longitudinal studies, Brenner and Mooney⁸ found that unemployment was positively correlated with suicide rates in several Western countries. Individual-level longitudinal studies provided even stronger evidence of an association. Most case-control analyses found significantly greater "unemployment, job instability or occupational problems" among people who

had committed or attempted suicide than among those who had not.^{9,20} Among the census-based cohorts of unemployed British men,³⁴ Finnish men,³⁸ and Danish men and women,³⁹ rates of death due to suicide were 1.6, 1.9 and 2.5 times greater, respectively, than those of the reference populations (Table 2).

Two recent time-series analyses found strong aggregate-level correlations between unemployment and suicide among young adults, especially men. Morrell and collaborators⁴⁵ found the same pattern over an 83-year period from 1907 to 1990 in Australia. Other analyses have found strong correlations between unemployment and suicide among young men in France, Australia, the United States and Canada between 1966 and 1987, but weak correlations in Sweden, Japan and the former West Germany during the same period.⁴⁵ These last three countries have historically had low rates of youth unemployment; as well, unemployed people have had strong support from state welfare in Sweden and the former West Germany, and from family networks in Japan.⁴⁵ Pritchard⁴⁶ also noted significant correlations between unemployment and suicide rates in young men in 9 of 12 European countries between 1974 and 1987.

Health selection may be an important confounding factor affecting the results of such studies; psychiatric illness can predispose people both to unemployment and to suicide. Conversely, the association with unemployment may be underestimated as a result of the known under-reporting of suicide and the misreporting of suicide as accidental death. Cultural attitudes toward suicide and the availability of firearms further complicate the picture.³³ Still, "economic insecurity" (such as that caused by unemployment) may be an "important antecedent variable in the causal chain" leading a person to harm himself or herself.^{18,20}

DEATHS DUE TO MOTOR-VEHICLE ACCIDENTS

Adams³³ found an inverse correlation between unemployment levels and rates of fatalities in motor-vehicle accidents in Canada. When unemployment is high, there may be a decline in business-related traffic; people may be less able to afford to drive and therefore less exposed to the risk of traffic accidents.³³

A time-series analysis from 1976 to 1980 in the United States also found this negative association, especially among young men.⁴⁷ The national rate of traffic fatalities, traditionally the highest in this demographic group, seemed to fall when the unemployment level rose. However, when the researchers controlled for the number of miles driven, unemployment was associated with higher rates of traffic fatalities. The authors suggested that the stress of joblessness may cause poorer attention to safe driving, but they did not test this hypothesis.

D'Arcy and Siddique^{31,48} analysed the results of the 1978–79 Canada Health Survey to find the relation of unemployment to physical or psychologic health outcomes. In comparison with employed people, unemployed people had greater self-reported levels of "psychological distress," "anxiety or depressive symptoms," "current health problems," "short-term disability" (causing absence from work for the previous 2 weeks), "long-term disability" (absence from work for the previous 12 months), hospital admissions in the past year (2.1 times more than employed people) and visits and telephone calls to physicians (33% more than employed people). Differences remained significant after adjustment for demographic and socioeconomic factors.

The analysis of the Canada Health Survey had limitations. Because it was cross-sectional, it could not suggest the direction of causation. Health selection could not be ruled out since respondents who were already ill could have been clustered among the unemployed people surveyed. As well, some difference found to be statistically significant as a result of the large sample size were of questionable health significance; for example, unemployed people reported a mean 1.14 "current health problems" whereas a mean 1.02 were reported by employed people.

We reviewed two Canadian and two European individual-level "factory-closure" studies.

In Canada, Grayson³⁰ followed a cohort of 310 men laid off when a ball bearings manufacturer shut down during the 1981–82 recession. Those still jobless after 2 years reported greater stress, poorer overall health, more visits to physicians and more medications taken than when they were working. Their spouses also reported more symptoms after the layoffs. However, this study had a "before–after" design and lacked a control group of workers. Moreover, those workers still unemployed after 2 years may have been in poorer health than others before the plant closure; their prolonged unemployment may have been due to the health-selection effect.

Grayson also studied the effect of the closure of the Toronto plant of Canadian General Electric in 1984.⁴⁹ The 400 laid-off workers were mainly male, highly skilled and well paid; they had worked at the plant a mean of 14 years. Up to 27 months after the plant closure, half of the workers and their spouses "still ranked the stress as greater than or equal to divorce." In comparison with the Ontario respondents to the Canada Health Survey, the laid-off workers and their spouses reported more "headaches," "hay fever or allergy," "back, limb or joint disorders" and "arthritis." However, the clinical significance of these symptoms was not explored, nor were the symptoms confirmed by medical examination. Grayson mentioned "abnormal illness behaviour" as an

explanation for the higher rate of symptoms, although he believed the workers' suffering to be genuine.

Iversen, Sabroe and Damsgaard⁵⁰ tested 1000 laid-off Danish shipyard workers for psychiatric symptoms during a 3-year follow-up period and found significantly worse results among the sample than among a control group of workers employed at another shipyard. This study had several strengths: a large sample size, a closely matched control group, adequate follow-up and a validated instrument for measuring mental health.

In a smaller cohort study of 85 workers laid off as a result of the closure of a Norwegian sardine factory, Westin, Norum and Schlesselman⁵¹ found that, during the 4 years after plant closure, rates of sick leave and disability pensions collected (proxy indicators of morbidity) were two and three times greater, respectively, among the laid-off workers than those among a control group of workers.⁵¹ However, this study did not control for any nonmedical incentives for taking sick leave or collecting pensions.

Dooley and Catalano⁵² combined aggregate-level and individual-level analysis in a study with cross-level design to examine the relations among individual job loss, the unemployment rate and mental health outcomes. They surveyed 8000 people in Greater Los Angeles with the use of random interviews by telephone from 1978 to 1982. Results showed that individual job loss explained more of the variance in mental health outcomes than did the regional unemployment rate, which ranged from 4.8% to 8.6%. Moreover, job loss occurred significantly more frequently among people with a lower socioeconomic status, defined by income and education, than among those with an upper or middle socioeconomic status. Thus, social class had a greater influence than the prevailing economic climate (as reflected by the unemployment rate) on mental health outcomes.

ALCOHOL CONSUMPTION

In the analysis of data from the Canada Health Survey, unemployed respondents reported a lower mean alcohol intake than employed respondents.⁴⁸ Two other Canadian cross-sectional studies found more drinking among unemployed than among employed people; however, these studies included heavy drinkers who were jobless because of their drinking.^{53,54} A recent prospective study of 1000 young adults in Sweden found a "clear [positive] correlation" between heavier drinking and joblessness, especially long-term joblessness; the correlation was stronger for young men than for young women.⁵⁵ In contrast, a recent British cohort study did not find that alcohol intake increased with "nonemployment"; however, this study involved retirees as well as those who had lost their jobs.⁵⁶

Therefore, depending on the circumstances, unemployment may be associated with decreased alcohol consumption due to lack of money or with increased intake because of more leisure time or a poor coping response.

USE OF MENTAL HEALTH SERVICES

Because data in the area are routinely collected and made available, use of health care services was often chosen as the outcome in studies of unemployment and health. Measures of service use do not reflect actual disease incidence as much as the burden of illness on societal resources; hence, results using these measures have policy implications. We reviewed three Canadian and three US analyses of the use of mental health care services.

Adams' time-series analysis for Canada found a positive correlation between unemployment levels and rates of admission to psychiatric hospitals for "psychotic" diagnoses.³³

However, Trainor, Boydell and Tibshirani³⁷ found an inverse association between unemployment and rates of admission to and discharge from psychiatric hospitals in Metropolitan Toronto from 1978 to 1983. Other factors influencing admission and discharge rates were changes in admission criteria and hospital capacity levels.

In a study of admissions to and discharges from Hamilton Psychiatric Hospital, Hamilton, Ont., from 1960 to 1977, Dear, Clark and Clark⁵⁸ found that the economic climate may have indirectly affected rates by influencing changes in hospital policy. The trend toward moving psychiatric patients from institutional to community care during this period was likely also a major factor.

Brenner and Mooney^{13,17} reported positive correlations between unemployment and first-time admissions to psychiatric hospitals in New York state during a 50-year period up to 1967 on the basis of time-series data. Ahr, Gorodezky and Cho,⁵⁹ in a study conducted in Missouri in the 1970s, found that unemployment was correlated with readmissions, but not first-time admissions, to state psychiatric hospitals. In a before-after comparison, readmissions increased by 30% and outpatient caseloads by more than 50% in the 6 months after the jobless rate had peaked.

Kiernan and colleagues,⁶⁰ in a study conducted in Illinois between 1970 and 1985, found a bimodal (two-peak) lagged effect of "decreased labour force participation." After 1 month, they found increased admissions to psychiatric hospitals, probably involving people with marginal mental health who were "tipped over the edge" by hard times. They also saw a more gradual (3- to 6-month) lagged increase in community-agency caseloads, which may have been made up of more stable people who had exhausted their personal resources.⁶⁰

An individual-level retrospective cohort study by Linn, Sandifer and Stein⁶¹ documented more frequent

somatization, depression, anxiety, physician visits and medication use among unemployed US military veterans than among employed veterans. However, this study had a small sample (30 subjects and 30 controls).

USE OF GENERAL HEALTH CARE SERVICES

Several studies reported increased use of general health care services, evinced by increases in such measures as visits to physicians, hospital inpatient or outpatient admissions and use of prescription medication^{6,24,41,61-64} (Table 3). In D'Arcy and Siddique's analysis,^{31,48} one in six unemployed people reported admission to hospital in the previous year, compared with one in 13 employed respondents. Unemployed respondents also reported 33% more visits to physicians: a mean of 3.40 visits in the previous year, compared with 2.55 by employed respondents.

Long-term follow-up studies of British workers laid off as a result of factory closure^{62,63} found that these workers had double the rate of general hospital admissions, 60% to 63% more outpatient visits and 20% to 57% more visits to general practitioners than all working-age men. Linn and coworkers⁶¹ found that, at any one time, unemployed US veterans were taking a mean 3.6 medications, compared with 1.9 medications being taken by employed veterans (Table 3).

Yuen and Balarajan's longitudinal study⁶⁴ of 13 275 unemployed men found significantly higher odds that these men had consulted general practitioners in the past week than had the reference group of all working-age men (odds ratio [OR] 1.83). For those jobless for 5 or more years, the odds were even greater (OR 2.12). Exclusion of those with chronic illnesses from the analysis (to minimize health-selection bias) still resulted in a significant OR of 1.53 (Table 3).

The association of unemployment with increased use of health care depends, however, on the services being universally available and free of charge at point of use, as they are in Canada and Britain and for military veterans in the United States.^{10,26,62,64} In the United States, in contrast, hard economic times may mean "nearly empty waiting rooms" because jobless people often lack health insurance and the ability to pay. This has been called the "inverse-care law": those most in need of care become the least likely to receive it.²⁷

DISCUSSION

WEIGHING THE EVIDENCE: CRITERIA FOR CAUSATION

We assessed the study findings from this literature review according to the epidemiologic criteria for causation.²⁹ Because we reviewed only published docu-

ments, our assessment may be vulnerable to publication bias (the tendency for positive study findings to be published and cited more often than negative or neutral results).

Temporal direction

Most aggregate-level time-series analyses demonstrated increased rates of adverse health outcomes following rises in unemployment.^{8,10-17,20,42,43,52} The time lags varied among studies, however; among Brenner's studies, the reported lags ranged from 2 to 10 years.^{8,12,15-17} Time lags remain an issue of some contention.⁶⁵

Stronger evidence came from individual-level longitu-

dinal studies such as those of European census-based cohorts and of factory closures. Significant adverse health events followed job loss; the reverse temporal direction was not found.^{30,34-39,49-51}

Strength of association

Only individual-level, not aggregate-level, studies could be assessed by this criterion on the basis of the RRs, ORs and SMRs reported for people "exposed" to unemployment compared with those not exposed. All of the published RRs and ORs exceeded 1.0, and all SMRs exceeded 100; most, although not all, reported associations were statistically significant. Most RRs and ORs

Table 3: Results of studies of the use of health care services by unemployed people

Study	Study population	Type of study	Size of sample of unemployed people	Service used	Relative risk or odds ratio (95% CI or p value, if given)
Studies of visits to physicians					
D'Arcy ⁴⁸	Canadian survey respondents 15 years of age and over who were in the labour force	Cross-sectional (aggregate-level)	1803	Visits to physicians in the previous year	1.33 (< 0.05)
Beale et al ^{62,63}	British workers threatened with lay-off or laid off as a result of plant closures	Individual-level, factory-closure cohort	Not available	Visits to general practitioners (GPs)	1.2-1.57
Linn et al ⁶¹	US veterans 35-60 years of age	Retrospective cohort	30	Visits to physicians	4.9 (< 0.02)
Yuen et al ⁶⁴	British men 18-64 years of age	Longitudinal (census-based cohort)	1592	Visits to GPs	1.83 (1.61-2.09) 1.53 (1.34-1.76), excluding chronically ill subjects
Studies of visits or admissions to hospitals					
D'Arcy ⁴⁸	Canadian survey respondents 15 years of age and over who were in the labour force	Cross-sectional (aggregate-level)	1803	Admissions to hospital in the previous year	1.33
Beale et al ^{62,63}	British workers threatened with lay-off or laid off as a result of plant closures	Individual-level, factory-closure cohort	Not available	Visits to outpatient department Admissions to hospital	1.63 2.0
Studies of the use of prescription medications					
D'Arcy ⁴⁸	Canadian survey respondents 15 years of age and over who were in the labour force	Cross-sectional (aggregate-level)	1803	Prescription medications used in previous year	1.0
Linn et al ⁶¹	US veterans 35-60 years of age	Retrospective cohort	30	Prescription medications used in previous 6 months	1.9 (< 0.1)

were in the range of 1.2 to 2.0 and SMRs from 120 to 200,^{34-39,61,63,64} a magnitude considered moderate.

Dose-response relation

In the Finnish census-based cohort study, subgroups of men who were jobless for long periods had progressively higher SMRs the longer they were unemployed (Table 1).³⁸ In the study conducted in Greater London, Franks and associates⁴³ found that the rate of death due to stroke among men increased by 5.4 per 100 000 for every 1% rise in the unemployment rate. The evidence from these two studies is only suggestive; most studies did not address the dose-response relation.

Consistency of findings

A positive association was found consistently in aggregate-level studies of rates of overall mortality (the study by Adams being an exception³³) and of death due to cardiovascular disease.^{8,10-17,20,33,42,45,46} Adams' Canadian time-series analysis³³ suggested an inverse relation between unemployment and deaths due to motor-vehicle accidents, but the US time-series analysis⁴⁷ found a mixed association.

Individual-level longitudinal studies consistently showed an association with increased suicide rates,^{20,34,38,39} with general physical or mental health problems,^{30,31,44,46-48,50,52,62} and with greater use of general health care services.^{31,48,61-64} However, findings concerning the use of mental health services (especially psychiatric-hospital admissions)⁵⁷⁻⁶⁰ and alcohol consumption were inconsistent.⁵³⁻⁵⁶

Experimental evidence

There were no experiments (such as randomized controlled trials) involving the deliberate exposure of people to job loss, for obvious ethical reasons.

Specificity

The association between unemployment and poor health lacked specificity: no particular physical or mental health problem was caused only by the lack of a job; conversely, unemployment did not cause just one kind of disorder. The range of health effects appeared to be very broad in all of the studies.

Analogy

Although the studies reviewed did not test this criterion directly, we inferred that the unemployment-ill health association is analogous to the reported associa-

tions between other negative social or economic conditions (such as poverty, low educational levels or inequality among social classes) and adverse health outcomes. These associations have been reported by many authors;⁶⁶⁻⁶⁸ review of the numerous studies is beyond the scope of this article.

Biologic plausibility

Unemployment may exert detrimental effects on health through many mechanisms: (1) by disrupting community and personal social relationships,^{6,8,9,28,41,69} (2) by leading to greater risk behaviour (alcohol consumption and poor diet),^{8,25,44,45} (3) by causing stress,^{28,36,40} and (4) by precipitating a bereavement reaction, like that caused by other losses.^{6,28}

These mechanisms lend plausibility to the hypothesis that unemployment causes mental or physical health problems; this connection, in turn, may make the observed association with increased mortality rates plausible.

We did not assess the evidence for any particular mechanism or series of mechanisms since our main purpose was to assess whether, not how, unemployment has adverse effects on health. However, our review found much postulation and discussion of mechanisms without any actual testing of specific hypotheses. Further research is needed to untangle the complex web of causation, which involves many factors that initiate, mediate and prolong health problems.

CONCLUSION

In keeping with the common perception that unemployment is an adverse life event or condition, we found that the evidence strongly supports an association between unemployment and a greater risk of morbidity (physical or mental illness or use of health care services), both at the population and individual levels, and a greater risk of mortality at the population level.

Epidemiologic evidence suggests that the direction of causation from unemployment to illness is greater than the converse (illness causes unemployment); however, the relation is, as mentioned above, complex.

Although more research can be done to elucidate mechanisms and mediating factors, there is enough evidence to recommend that intervention research, to determine ways to reduce the adverse effect of unemployment on health, be a priority. Primary prevention strategies, involving the prevention or reduction of unemployment, should be tested, as well as secondary and tertiary prevention of recurrent or permanent adverse health consequences of unemployment.

Although unemployment and economic issues may seem beyond the usual bounds of health care, physicians

and other health care professionals have the opportunity to recognize, treat and possibly prevent the adverse consequences of unemployment for their patients. Beyond caring for individuals, however, health care professionals can also play an important role in collective action against unemployment by "advocating for health."

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AVIS AUX MÉDECINS

Demande de collaboration pour trouver les personnes atteintes de la maladie de Creutzfeldt-Jakob qui peuvent avoir donné du sang

Même si la transmission de la maladie de Creutzfeldt-Jakob par la mère, l'hormone de croissance, la gonadotrophine et la cornée a été documentée, la possibilité de transmission par transfusion sanguine suscite toujours la controverse. Cependant, plusieurs fabricants et organisations chargés de programmes transfusionnels, y compris la Société canadienne de la Croix-Rouge, ont pris des précautions pour prévenir ce risque théorique de transmission par le sang.

La Société canadienne de la Croix-Rouge demande aux médecins du Canada de l'aider à trouver, avec leur consentement, des personnes atteintes de la maladie de Creutzfeldt-Jakob diagnostiquée et qui ont donné du sang. Cela permettra de trouver et d'éliminer les éléments et les produits tirés du sang donné par ces personnes.

Nous aimerions aussi savoir si les personnes en question ont reçu des transfusions sanguines. Ces renseigne-

ments nous aideront à pousser les études sur le lien entre la maladie de Creutzfeldt-Jakob et la transfusion sanguine. Nous vous remercions de votre collaboration.

L'approvisionnement en sang du Canada est sûr et, avec votre aide, nous pouvons le rendre encore plus sûr.

Pour fournir des renseignements et en obtenir davantage, veuillez communiquer avec le Dr M.T. AYE à l'adresse ci-dessous.

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